

# Introduction to the Terms Arteriosclerosis, Thrombosis and Embolism

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**Abstract:** Arteriosclerosis as a medical term has its origins in the 18th century and refers to “hardening of the arteries” and is composed of two words, arterio and sclerosis. Arterio is derived from the Latinized form of the Greek word *arteria*, which originally meant “windpipe” or “an artery”. Sclerosis refers to “morbid hardening of the tissues” and -osis is a Greek suffix meaning “a state of disease”. The term thrombosis has its origins in the Greek word *thrombos*, meaning “lump, piece, clot of blood, curd of milk”. The term was first used to describe venous thrombosis. The first well-documented case of deep venous thrombosis appeared during the Middle Ages, and the major pathologic mechanisms of the disease were discovered by the middle of the 19th century, recapitulated by the German physician and pathologist Virchow. He realized that a venous thrombus can dislodge from its origins and travel through the blood stream and cause the blockade of vessels of other organs, hence also the term embolism.

## 1. Arteriosclerosis, Arteriolosclerosis, and Atherosclerosis

Arteriosclerosis as a medical term refers to “hardening of the arteries” and is composed of two words, arterio and sclerosis. Arterio is derived from the Latinized form of the Greek word *arteria*, which originally meant “windpipe” or “an artery”. Sclerosis refers to “morbid hardening of the tissues” and -osis is a Greek suffix meaning “a state of disease”. In current textbook classifications, arteriosclerosis refers to an overarching generic term with hardening and thickening of the arterial wall and loss of elasticity as the main underlying pathologic processes. The three distinct types of arteriosclerotic pathology include atherosclerosis, arteriolosclerosis, and Mönckeberg’s medial calcific sclerosis [1].

The terminology used to describe lesions related to arteriosclerosis has its origins in the 18th century. The Greek term *atheroma* was first used in 1755 by Swiss anatomist Albrecht van Haller (1708–1777) to describe a space filled with gruel-like material [2]. The German-born French pathologist and surgeon Jean Frédéric Martin Lobstein (1777–1835) first used the term arteriosclerosis in 1833 to depict calcified arterial lesions [3]. For the term arteriolosclerosis, credit is given to English physician George Johnson (1818–1896), who described thickening of arterioles of the kidney in 1852 [4]. Mönckeberg’s medical calcific sclerosis was named after German pathologist Johann Georg Mönckeberg (1877–1925) in 1903 [5]. Finally, the term atherosclerosis was first mentioned in the literature apparently by another German pathologist, Felix Marchand (1846–1928), in 1904 [6]. It should be noted that although the terminology describing arteriosclerosis is relatively young, the first described lesions of arteriosclerosis are in fact thousands of years old, as depicted by

the Swiss-born British experimental pathologist and bacteriologist, Sir Marc Armand Ruffer (1859–1917), in his examinations on the histology of Egyptian mummies [7].

## 2. Thrombosis

The term thrombosis has its origins in the Greek word thrombos, meaning “lump, piece, clot of blood, curd of milk”. The term was first used to describe venous thrombosis. The first well-documented case of deep venous thrombosis appeared during the Middle Ages, and the major pathologic mechanisms of the disease were discovered by the middle of the 19th century. The German physician and pathologist, Rudolph Ludwig Carl Virchow (1821–1902), also known as the “the father of modern pathology” first recapitulated the pathophysiology of thrombosis in 1858 describing the three common predisposing factors for the condition (the Virchow’s triad): (1) damage to the endothelial lining of the vessel wall; (2) a hypercoagulable state, and (3) arterial or venous blood stasis [8].

## 3. Embolism

Virchow realized that a venous thrombus can dislodge from its origins and travel through the blood stream and cause the blockade of vessels of other organs. He stated that “The detachment of larger or smaller fragments from the end of the softening thrombus which are carried along by the current of blood and driven into remote vessels. This gives rise to the very frequent process on which I have bestowed the name of Embolia” [9]. Hence, the term embolism is also credited to Virchow, pointing to sudden obstruction of a blood vessel by an embolus. Virchow depicted two types of thrombi associated with pulmonary embolism, one that has origins in a systemic vein and embolizes to the lung and another, that arises in the pulmonary artery distal to the embolus due to blood flow stagnation. The etymological origins of these terms arise from the Greek term embolus, denoting “peg, stopper; anything pointed so as to be easily thrust in” or also “a tongue (of land), beak (of a ship)”. Furthermore, another Greek word, emballein, meant “to insert, throw in, invade”.

Interestingly, the first description of cardiac embolism was by a neurologist, the British Sir William Gowers (1845–1915). He described simultaneous emboli in the brain and retina, spleen and kidneys, and concluded that the emboli had originated from the left atrial appendage, which contained blood clots [10].

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